

REFERENCE: SF-280100

PROJECT: 17BP.9.R.101

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	SF-280100	1	33

# STATE OF NORTH CAROLINA

## DEPARTMENT OF TRANSPORTATION

### DIVISION OF HIGHWAYS

### GEOTECHNICAL ENGINEERING UNIT

# STRUCTURE

# SUBSURFACE INVESTIGATION

COUNTY DAVIDSON

PROJECT DESCRIPTION BRIDGE NO. 100 ON SR 1810  
(CLODFELTER RD.) OVER ABBOTTS CREEK  
BETWEEN SR 1817 AND SR 1798

SITE DESCRIPTION STA. 15 + 99.50 -L-

## CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2, 2A	LEGEND (SOIL & ROCK)
2B, 2C	SUPPLEMENTAL LEGEND (GSI)
3	SITE PLAN
4-5	PROFILE(S)
6-9	CROSS SECTION(S)
10-21	BORE LOG(S) & CORE REPORT(S)
22-23	SOIL TEST RESULTS
24-25	ROCK TEST RESULTS
26-29	CORE PHOTOGRAPH(S)
30	SITE PHOTOGRAPH(S)

## PERSONNEL

B. SMITH, PG

B. WORLEY, PG

M. SHIPMAN, EI

L. GONZALEZ

D. SUTTON

INVESTIGATED BY B. SMITH, PG

DRAWN BY B. SMITH, PG

CHECKED BY B. WORLEY, PG

SUBMITTED BY B. SMITH, PG

DATE MAY, 2018

Prepared in the  
Office of:



NC FIRM LICENSE No: P-0339 and C-487  
 504 Meadowlands Drive  
 Hillsborough, NC 27278  
 (919) 732-3883  
 (919) 732-6676 (FAX)

## CAUTION NOTICE

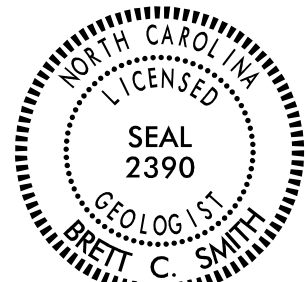
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

## NOTES:

- THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
- BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.



DocuSigned by  
  
 BE61A49304C542E... 5/18/2018

SIGNATURE

DATE

**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

SF-280100

2

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
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# SUBSURFACE INVESTIGATION





## SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS (PAGE 1 OF 2)

SOIL DESCRIPTION										GRADATION																																																																								
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6										WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.																																																																								
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COLOR										DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.																																																																								

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
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# SUBSURFACE INVESTIGATION

## SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS (PAGE 2 OF 2)

ROCK DESCRIPTION		TERMS AND DEFINITIONS	
<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>			
WEATHERED ROCK (WR)		NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.	
CRYSTALLINE ROCK (CR)		FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.	
NON-CRYSTALLINE ROCK (NCR)		FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	
COASTAL PLAIN SEDIMENTARY ROCK (CP)		COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	
WEATHERING			
FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.		
VERY SLIGHT (V SL.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.		
SLIGHT (SL.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.		
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.		
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <u>IF TESTED, WOULD YIELD SPT REFUSAL</u>		
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES &gt; 100 BPF</u>		
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</u>		
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.		
ROCK HARDNESS			
VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.		
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.		
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.		
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.		
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.		
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.		
FRACTURE SPACING		BEDDING	
TERM	SPACING	TERM	THICKNESS
VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	4 FEET
WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET
MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET
CLOSE	0.16 TO 1 FOOT	VERY THINLY BEDDED	0.03 - 0.16 FEET
VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET
		THINLY LAMINATED	< 0.008 FEET
INDURATION			
FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.			
FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.		
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.		
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.		
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.		
BENCH MARK: BL-2 (N: 789005 E: 1654949)		ELEVATION: 690.91 FEET	
NOTES:			
FIAD = FILLED IMMEDIATELY AFTER DRILLING			

DATE: 8-15-14

SF-280100

2B

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# SUBSURFACE INVESTIGATION

## SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (PAGE 1 OF 2)

AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000)

### GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000)

From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis.

SURFACE CONDITIONS

**VERY GOOD**  
Very rough, fresh unweathered surfaces

**GOOD**  
Rough, slightly weathered, iron stained surfaces

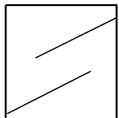
**FAIR**  
Smooth, moderately weathered and altered surfaces

**POOR**  
Slickensided, highly weathered surfaces with compact coatings or fillings or angular fragments

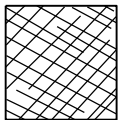
**VERY POOR**  
Slickensided, highly weathered surfaces with soft clay coatings or fillings

## STRUCTURE

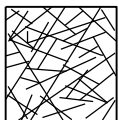
DECREASING SURFACE QUALITY →



INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities



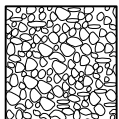
BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets



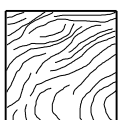
VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets



BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity

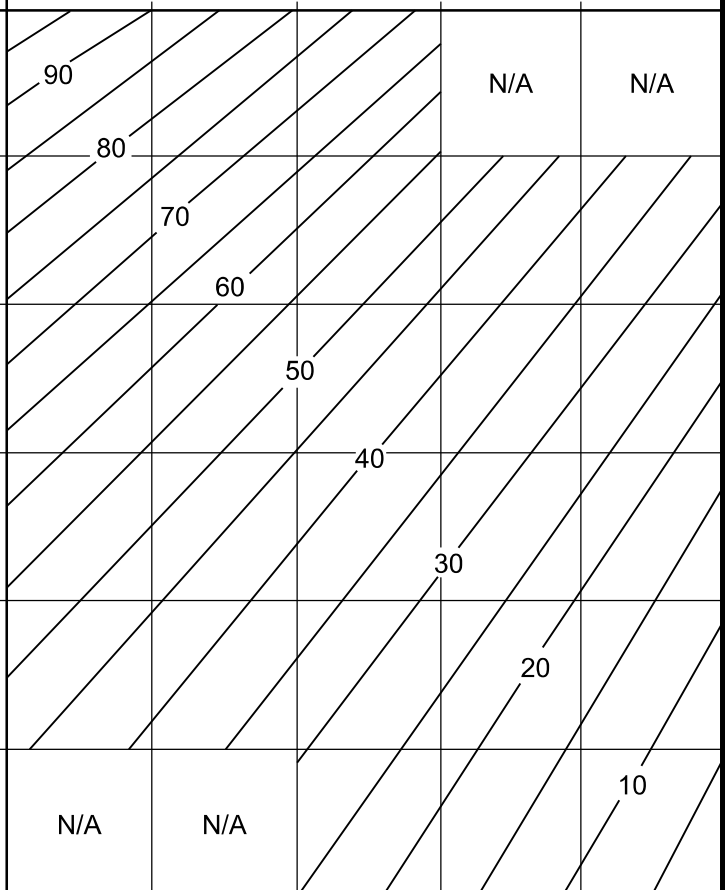


DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces



LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes

DECREASING INTERLOCKING OF ROCK PIECES ↓



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# **SUBSURFACE INVESTIGATION**

## **SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (PAGE 2 OF 2)**

AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)

GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos, P and Hoek E., 2000)

From a description of the lithology, structure and surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the condition of the discontinuities and estimate the average value of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fair, poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis.

SURFACE CONDITIONS OF DISCONTINUITIES  
(Predominantly bedding planes)

VERY GOOD - Very Rough, fresh unweathered surfaces

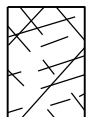
GOOD - Rough, slightly weathered surfaces

FAIR - Smooth, moderately weathered and altered surfaces

POOR - Very smooth, occasionally slickensided surfaces with compact coatings or fillings with angular fragments

VERY POOR - Very smooth, slickensided or highly weathered surfaces with soft clay coatings or fillings

### COMPOSITION AND STRUCTURE



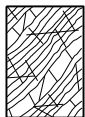
**A. Thick bedded, very blocky sandstone**  
The effect of pelitic coatings on the bedding planes is minimized by the confinement of the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally controlled instability.



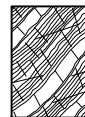
**B. Sandstone with thin inter-layers of siltstone**



**C. Sandstone and siltstone in similar amounts**



**D. Siltstone or silty shale with sandstone layers**

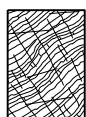


**E. Weak siltstone or clayey shale with sandstone layers**

**C, D, E, and G** - may be more or less folded than illustrated but this does not change the strength. Tectonic deformation, faulting and loss of continuity moves these categories to **F** and **H**.



**F. Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure**




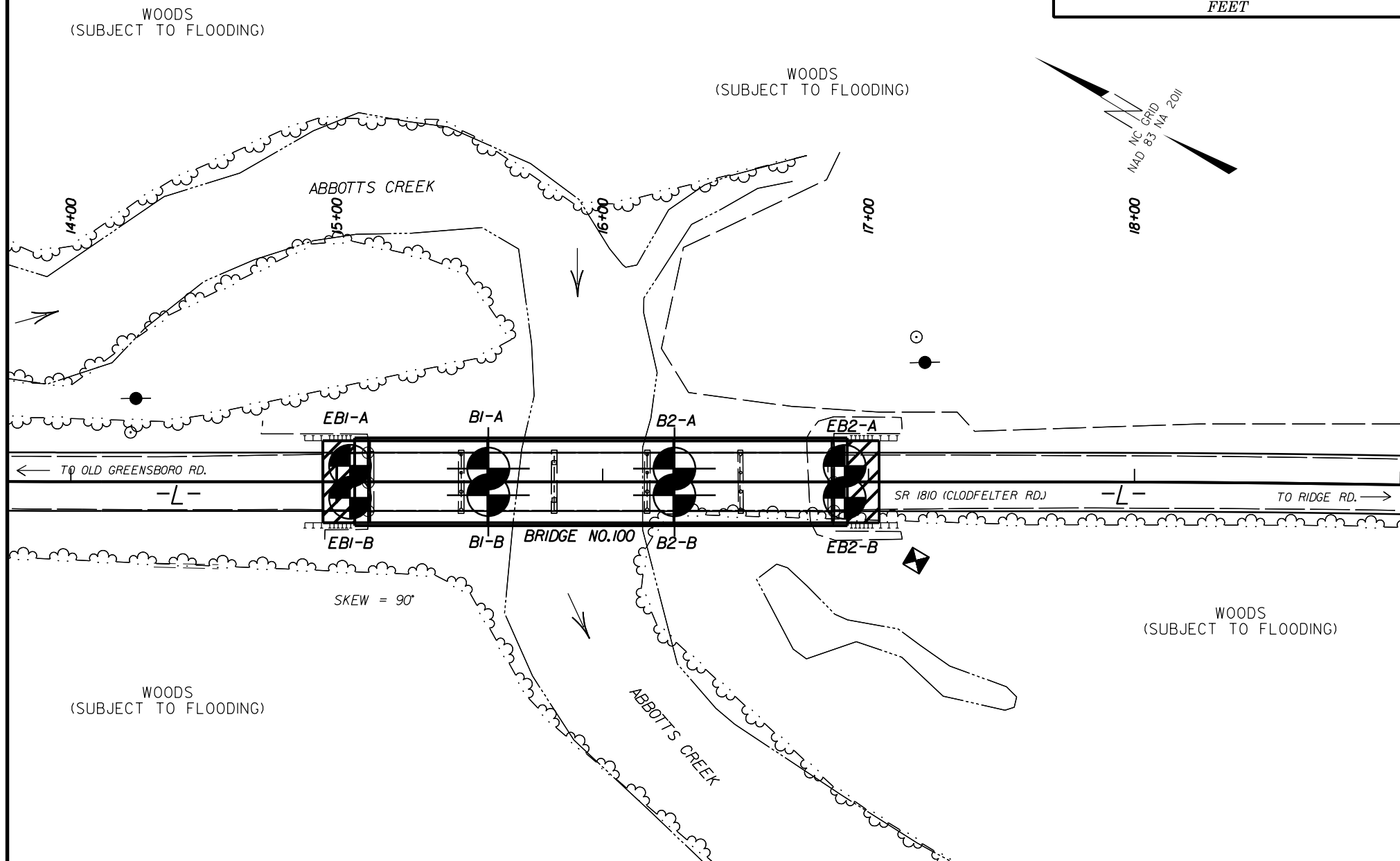
**G. Undisturbed silty or clayey shale with or without a few very thin sandstone layers**

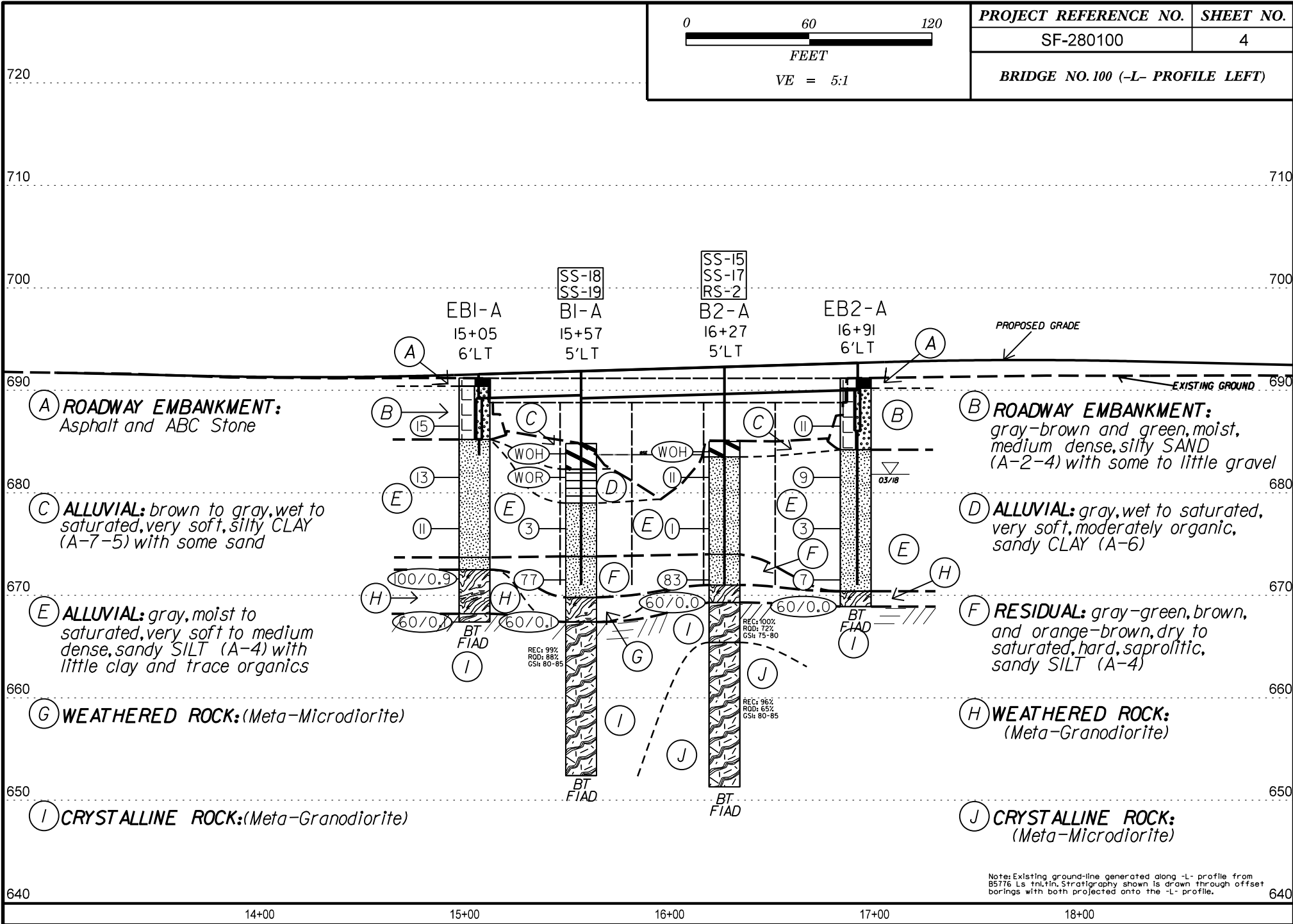


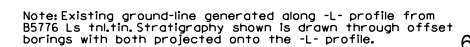
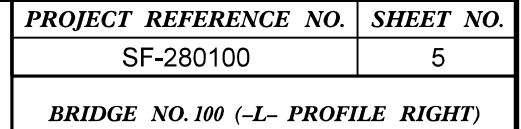
**H. Tectonically deformed silty or clayey shale forming a chaotic structure with pockets of clay. Thin layers of sandstone are transformed into small rock pieces.**

➡ Means deformation after tectonic disturbance

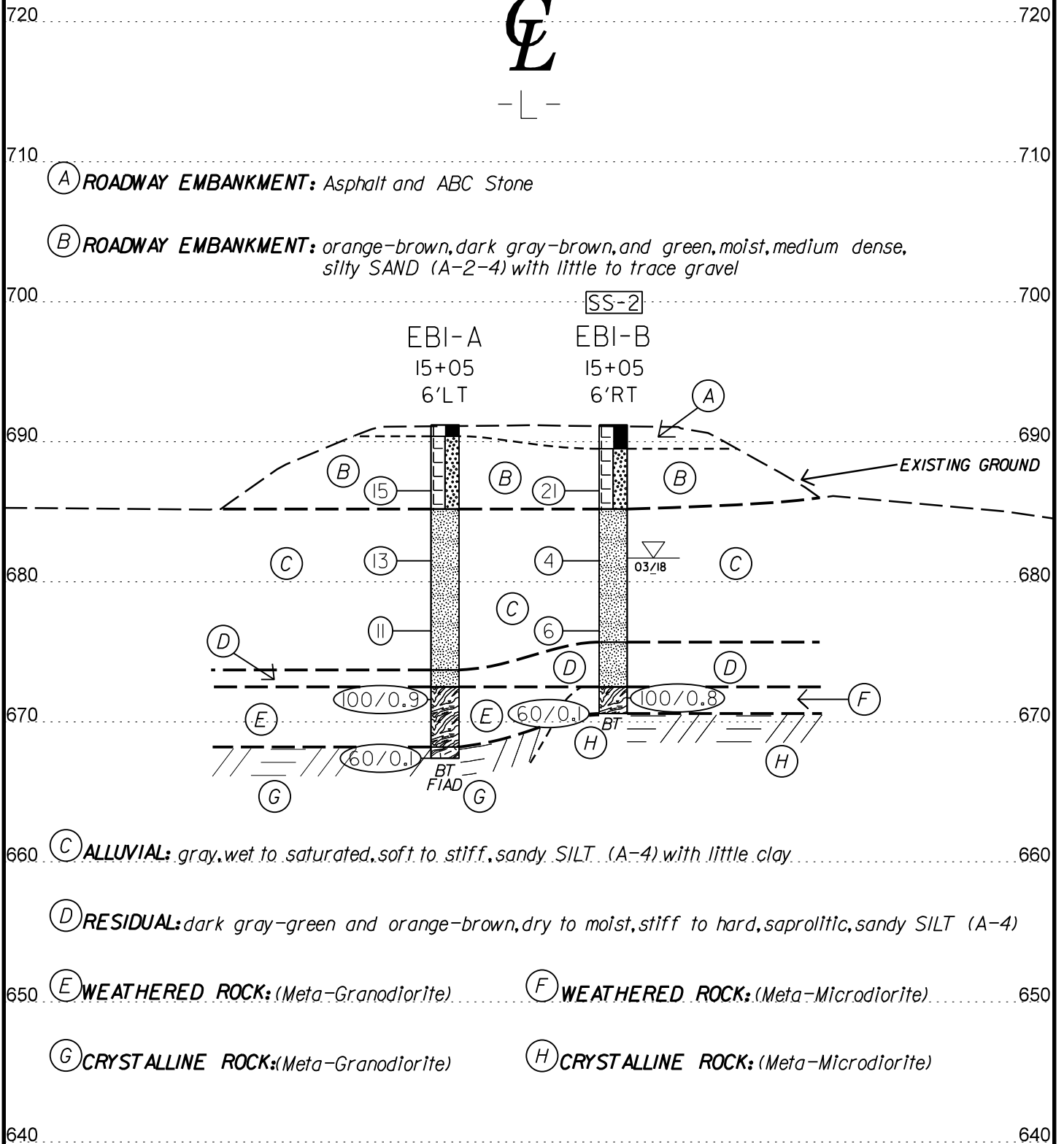
PROJECT REFERENCE NO.	SHEET NO.
SF-280100	3
<b>SITE PLAN</b>	
0                      50                      100  FEET	









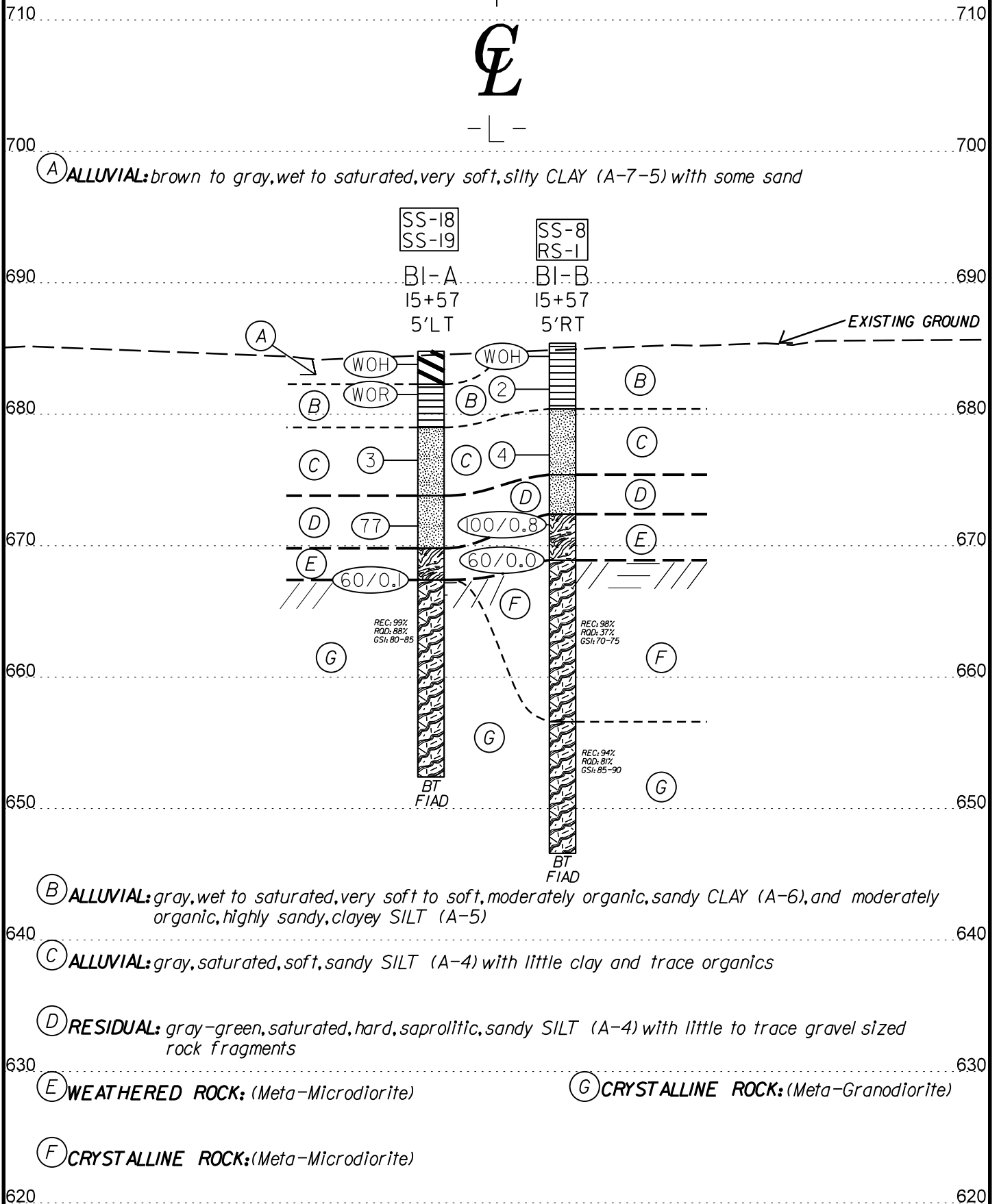


Note: Existing ground-line generated along End Bent 1 from B5776.Ls.tn.tin. Stratigraphy shown is drawn through offset borings with both projected onto the bent line.  
Bent skew = 90°

HORIZ. SCALE 0 10 20  
(FEET)

VE = 1:1

BRIDGE NO. 100 (END BENT 1)



- (A) **ALLUVIAL:** brown to gray, wet to saturated, very soft, silty CLAY (A-7-5) with some sand
- (B) **ALLUVIAL:** gray, wet to saturated, very soft to soft, moderately organic, sandy CLAY (A-6), and moderately organic, highly sandy, clayey SILT (A-5)
- (C) **ALLUVIAL:** gray, saturated, soft, sandy SILT (A-4) with little clay and trace organics
- (D) **RESIDUAL:** gray-green, saturated, hard, saprolitic, sandy SILT (A-4) with little to trace gravel sized rock fragments
- (E) **WEATHERED ROCK:** (Meta-Microdiorite)
- (F) **CRYSTALLINE ROCK:** (Meta-Microdiorite)
- (G) **CRYSTALLINE ROCK:** (Meta-Granodiorite)

Note: Existing ground-line generated along Bent 1 from B5776.Ls.tn1.tn. Stratigraphy shown is drawn through offset borings with both projected onto the bent line.  
Bent skew = 90°

HORIZ. SCALE 0 10 20  
(FEET)

VE = 1:1

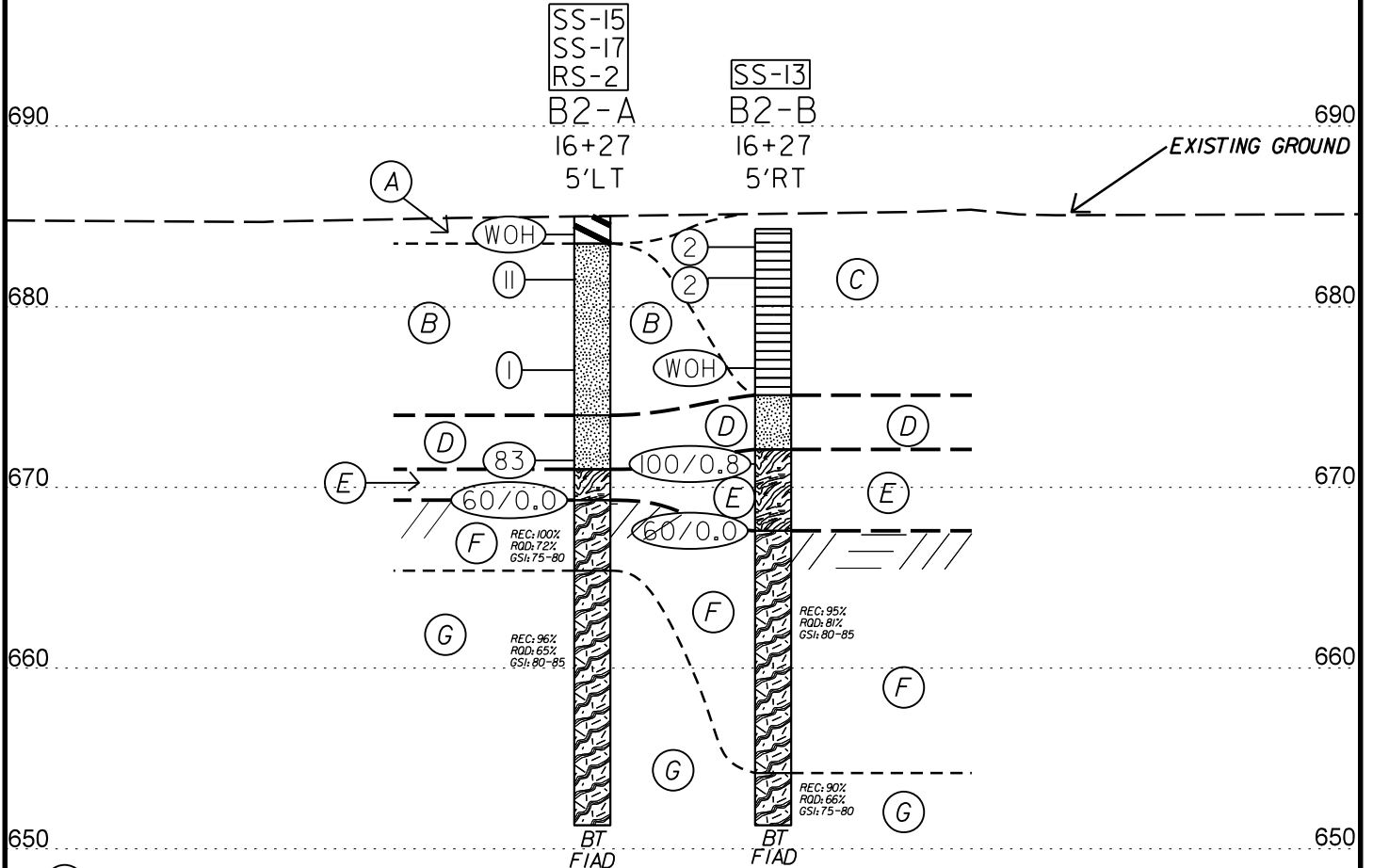
BRIDGE NO. 100 (BENT 1)

710 ..... 710

  
 - L -

700 ..... 700

(A) **ALLUVIAL:** brown, wet to saturated, very soft, silty CLAY (A-7-5) with some sand



(B) **ALLUVIAL:** gray, saturated, very soft to stiff, sandy SILT (A-4) with trace organics and gravel

(C) **ALLUVIAL:** brown to gray, wet to saturated, very soft to soft, sandy SILT (A-4) with some clay and little organics

(D) **RESIDUAL:** gray-green to brown, dry, hard, sandy SILT (A-4)

(E) **WEATHERED ROCK:** (Meta-Granodiorite)

(F) **CRYSTALLINE ROCK:** (Meta-Granodiorite)

(G) **CRYSTALLINE ROCK:** (Meta-Microdiorite)

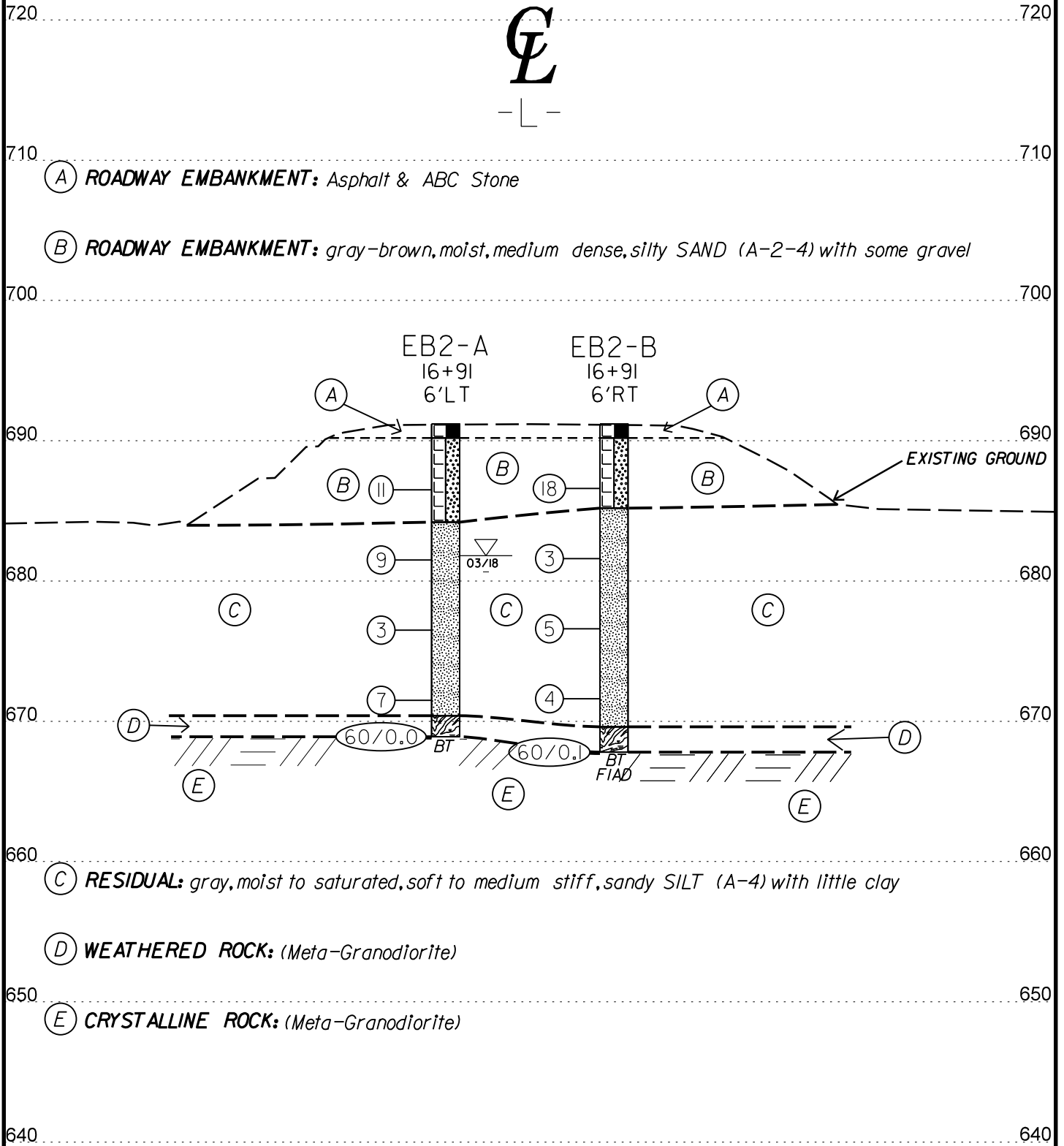
620 ..... 620

Note: Existing ground-line generated along Bent 2 from B5776\_Ls.tn.tin. Stratigraphy shown is drawn through offset borings with both projected onto the bent line.  
Bent skew = 90°

HORIZ. SCALE 0 10 20  
(FEET)

VE = 1:1

**BRIDGE NO. 100 (BENT 2)**



Note: Existing ground-line generated along End Bent 2 from B5776.Ls.tn.tn. Stratigraphy shown is drawn through offset borings with both projected onto the bent line.  
Bent skew = 90°

HORIZ. SCALE 0 10 20  
(FEET)

VE = 1:1

BRIDGE NO. 100 (END BENT 2)

WBS 17BP.9.R.101			TIP SF-280100			COUNTY DAVIDSON			GEOLOGIST Worley, B.						
SITE DESCRIPTION Bridge No. 100 on SR 1810 (Clodfelter Rd.) over Abbotts Creek									GROUND WTR (ft)						
BORING NO. EB1-A			STATION 15+05			OFFSET 6 ft LT			ALIGNMENT -L-			0 HR. Caved 6.8			
COLLAR ELEV. 691.2 ft			TOTAL DEPTH 23.8 ft			NORTHING 789,164			EASTING 1,654,846			24 HR. FIAD			
DRILL RIG/HAMMER EFF./DATE SUM3123 CME-550X 95% 11/30/2017						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic						
DRILLER Gonzalez, L.			START DATE 03/26/18			COMP. DATE 03/26/18			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)
695															
690															
685	687.5	3.7	4	8	7								M	691.2	0.0
														690.4	0.8
680	682.5	8.7	2	4	9								Sat.	685.2	6.0
675	677.5	13.7	WOH	4	7								Sat.		
670	672.5	18.7	22	78/0.4										673.7	17.5
														672.5	18.7
	667.5	23.7												668.2	23.0
			60/0.1											667.4	23.8
					</										

# GEOTECHNICAL BORING REPORT

## BORE LOG

SHEET 11

<b>WBS</b> 17BP.9.R.101			<b>TIP</b> SF-280100			<b>COUNTY</b> DAVIDSON			<b>GEOLOGIST</b> Worley, B.		
<b>SITE DESCRIPTION</b> Bridge No. 100 on SR 1810 (Clodfelter Rd.) over Abbotts Creek									<b>GROUND WTR (ft)</b>		
<b>BORING NO.</b> EB1-B			<b>STATION</b> 15+05			<b>OFFSET</b> 6 ft RT			<b>ALIGNMENT</b> -L-		
<b>COLLAR ELEV.</b> 691.2 ft			<b>TOTAL DEPTH</b> 20.6 ft			<b>NORTHING</b> 789,158			<b>EASTING</b> 1,654,836		
<b>DRILL RIG/HAMMER EFF/DATE</b> SUM3123 CME-550X 95% 11/30/2017						<b>DRILL METHOD</b> H.S. Augers			<b>HAMMER TYPE</b> Automatic		
<b>DRILLER</b> Gonzalez, L.			<b>START DATE</b> 03/26/18			<b>COMP. DATE</b> 03/26/18			<b>SURFACE WATER DEPTH</b> N/A		

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
695																
690																
	687.5	3.7														
685			10	10	11											
	682.5	8.7	4	2	2											
680																
	677.5	13.7	WOH	2	4											
675																
	672.5	18.7	27	73/0.3												
	670.7	20.5														
			60/0.1													

SOIL AND ROCK DESCRIPTION	
GROUND SURFACE	0.0
ROADWAY EMBANKMENT	
Asphalt and ABC Stone	1.7
orange-brown and gray, silty SAND (A-2-4)	
ALLUVIAL	6.0
gray, sandy SILT (A-4) with little clay	
RESIDUAL	15.5
dark gray-green, saprolitic, sandy SILT (A-4)	
WEATHERED ROCK (Meta-Microdiorite)	18.7
CRYSTALLINE ROCK (Meta-Microdiorite)	20.6
Boring Terminated with Standard Penetration Test Refusal at Elevation 670.6 ft on Crystalline Rock (Meta-Granodiorite)  - Auger refusal at 20.5 feet.	

NCDOT BORE SINGLE SF280100\_GEO\_BRDG0100\_SUMMIT\_GINT.GPJ NC\_DOT.GDT 5/17/18

# **GEOTECHNICAL BORING REPORT**


## **BORE LOG**

WBS 17BP.9.R.101			TIP SF-280100			COUNTY DAVIDSON			GEOLOGIST Shipman, M.							
SITE DESCRIPTION Bridge No. 100 on SR 1810 (Clodfelter Rd.) over Abbotts Creek								GROUND WTR (ft)								
BORING NO. B1-A			STATION 15+57			OFFSET 5 ft LT			ALIGNMENT -L-		0 HR. N/A					
COLLAR ELEV. 684.8 ft			TOTAL DEPTH 32.4 ft			NORTHING 789,119			EASTING 1,654,872		24 HR. FIAD					
DRILL RIG/HAMMER EFF./DATE SUM3123 CME-550X 95% 11/30/2017						DRILL METHOD NW Casing WSPT & Core			HAMMER TYPE Automatic							
DRILLER Gonzalez, L.			START DATE 03/29/18			COMP. DATE 03/29/18			SURFACE WATER DEPTH N/A							
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION		DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)		
685																
	684.8	0.0	WOH	WOH	WOH						SS-18	54%		GROUND SURFACE		0.0
	682.5	2.3	WOR	WOH	WOR						SS-19	90%		ALLUVIAL brown to gray, silty CLAY (A-7-5) with some sand		2.5
680																
	677.5	7.3														
675			WOR	1	2								Sat.			
	672.5	12.3											Sat.			
670			12	24	53											
	667.5	17.3														
665			60/0.1													
660																
655																

# GEOTECHNICAL BORING REPORT

## CORE LOG

SHEET 13

<b>WBS</b> 17BP.9.R.101				<b>TIP</b> SF-280100		<b>COUNTY</b> DAVIDSON				<b>GEOLOGIST</b> Shipman, M.			
<b>SITE DESCRIPTION</b> Bridge No. 100 on SR 1810 (Clodfelter Rd.) over Abbotts Creek										<b>GROUND WTR (ft)</b>			
<b>BORING NO.</b> B1-A				<b>STATION</b> 15+57		<b>OFFSET</b> 5 ft LT				<b>ALIGNMENT</b> -L-		<b>0 HR.</b> N/A	
<b>COLLAR ELEV.</b> 684.8 ft				<b>TOTAL DEPTH</b> 32.4 ft		<b>NORTHING</b> 789,119				<b>EASTING</b> 1,654,872		<b>24 HR.</b> FIAD	
<b>DRILL RIG/HAMMER EFF./DATE</b> SUM3123 CME-550X 95% 11/30/2017						<b>DRILL METHOD</b> NW Casing W/SPT & Core				<b>HAMMER TYPE</b> Automatic			
<b>DRILLER</b> Gonzalez, L.				<b>START DATE</b> 03/29/18		<b>COMP. DATE</b> 03/29/18				<b>SURFACE WATER DEPTH</b> N/A			
<b>CORE SIZE</b> NQ-2				<b>TOTAL RUN</b> 15.0 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		L O G	DESCRIPTION AND REMARKS  ELEV. (ft) <span style="float: right;">DEPTH (ft)</span>		
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %				
667.4											Begin Coring @ 17.4 ft		
665	667.4	17.4	5.0	2:28/1.0 1:28/1.0 1:44/1.0 1:36/1.0 1:56/1.0	(4.9) 98%	(3.8) 76%		(14.9) 99%	(13.2) 88%		667.4  <b>CRYSTALLINE ROCK</b> white, gray, and black, slight to v. slight weathering, hard, close to mod. close fracture spacing, META-GRANODIORITE GSI = 80-85  17.4		
660	662.4	22.4	5.0	1:32/1.0 1:45/1.0 1:41/1.0 1:53/1.0 2:13/1.0	(5.0) 100%	(4.8) 96%							
655	657.4	27.4	5.0	1:42/1.0 1:45/1.0 1:59/1.0 1:53/1.0 1:49/1.0	(5.0) 100%	(4.6) 92%							
	652.4	32.4									652.4		
											Boring Terminated at Elevation 652.4 ft in Crystalline Rock (Meta-Granodiorite)  - Boring drilled through bridge deck.		

NCDOT CORE SINGLE SF280100\_GEO\_BRDG0100\_SUMMIT\_GINT.GPJ NC\_DOT.GDT 5/17/18



# GEOTECHNICAL BORING REPORT

## BORE LOG

SHEET 14

<b>WBS</b> 17BP.9.R.101			<b>TIP</b> SF-280100			<b>COUNTY</b> DAVIDSON			<b>GEOLOGIST</b> Shipman, M.		
<b>SITE DESCRIPTION</b> Bridge No. 100 on SR 1810 (Clodfelter Rd.) over Abbotts Creek									<b>GROUND WTR (ft)</b>		
<b>BORING NO.</b> B1-B			<b>STATION</b> 15+57			<b>OFFSET</b> 5 ft RT			<b>ALIGNMENT</b> -L-		
<b>COLLAR ELEV.</b> 685.4 ft			<b>TOTAL DEPTH</b> 38.8 ft			<b>NORTHING</b> 789,114			<b>EASTING</b> 1,654,864		
<b>DRILL RIG/HAMMER EFF./DATE</b> SUM3123 CME-550X 95% 11/30/2017						<b>DRILL METHOD</b> NW Casing WSPT & Core			<b>HAMMER TYPE</b> Automatic		
<b>DRILLER</b> Gonzalez, L.			<b>START DATE</b> 03/27/18			<b>COMP. DATE</b> 03/27/18			<b>SURFACE WATER DEPTH</b> N/A		

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
690																
685	685.4	0.0													685.4	GROUND SURFACE
	682.9	2.5	WOR	WOH	WOH											
680															680.4	ALLUVIAL gray, moderately organic, highly sandy, clayey SILT (A-5)
	677.9	7.5	1	1	3											
675															675.4	gray, sandy SILT (A-4) with little clay and trace organics
	672.9	12.5	20	34	66/0.3										672.4	RESIDUAL gray-green, saprolitic, sandy SILT (A-4)
670															668.9	WEATHERED ROCK (Meta-Microdiorite)
	668.9	16.5	60/0.0													
665																CRYSTALLINE ROCK (Meta-Microdiorite) REC: 98% RQD: 37% GSI: 70-75
660																
															656.6	(Meta-Granodiorite) REC: 94% RQD: 81% GSI: 85-90
655																
650															646.6	Boring Terminated at Elevation 646.6 ft in Crystalline Rock (Meta-Granodiorite)  - Boring drilled through bridge deck. - Casing Advancer refusal at 16.5 feet.

NCDOT BORE SINGLE SF280100\_GEO\_BRDG0100\_SUMMIT\_GINT.GPJ NC\_DOT.GDT 5/17/18

# GEOTECHNICAL BORING REPORT

## CORE LOG

SHEET 15

<b>WBS</b> 17BP.9.R.101				<b>TIP</b> SF-280100		<b>COUNTY</b> DAVIDSON				<b>GEOLOGIST</b> Shipman, M.			
<b>SITE DESCRIPTION</b> Bridge No. 100 on SR 1810 (Clodfelter Rd.) over Abbotts Creek										<b>GROUND WTR (ft)</b>			
<b>BORING NO.</b> B1-B				<b>STATION</b> 15+57		<b>OFFSET</b> 5 ft RT				<b>ALIGNMENT</b> -L-		<b>0 HR.</b> N/A	
<b>COLLAR ELEV.</b> 685.4 ft				<b>TOTAL DEPTH</b> 38.8 ft		<b>NORTHING</b> 789,114				<b>EASTING</b> 1,654,864		<b>24 HR.</b> FIAD	
<b>DRILL RIG/HAMMER EFF./DATE</b> SUM3123 CME-550X 95% 11/30/2017						<b>DRILL METHOD</b> NW Casing W/SPT & Core				<b>HAMMER TYPE</b> Automatic			
<b>DRILLER</b> Gonzalez, L.				<b>START DATE</b> 03/27/18		<b>COMP. DATE</b> 03/27/18				<b>SURFACE WATER DEPTH</b> N/A			
<b>CORE SIZE</b> NQ-2				<b>TOTAL RUN</b> 22.3 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)	
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %				
668.9													
	668.9	16.5	1.2	N=60/0.0	(1.0)	(0.0)		(12.0)	(4.5)		Begin Coring @ 16.5 ft		
	667.7	17.7		2:28/1.0	83%	0%					<b>CRYSTALLINE ROCK</b>	16.5	
	666.6	18.8	1.1	1:26/0.2				98%	37%		dark green-gray, moderate to slight weathering, hard, very close to moderately close fracture spacing, META-MICRODIORITE.		
665			5.0	2:08/1.0	(1.0)	(0.3)					Meta-Granodiorite intrusion (24.8-25.8 ft.).		
				0:36/0.1	91%	27%					GSI = 70-75		
	661.6	23.8		1:54/1.0	(5.0)	(0.8)							
			5.0	1:31/1.0									
660				1:53/1.0	100%	16%							
			5.0	1:56/1.0	(5.0)	(3.4)	RS-1						
				3:05/1.0	100%	68%							
	656.6	28.8		2:04/1.0									
			5.0	1:30/1.0									
	656.6	28.8		2:31/1.0									
655			5.0	2:24/1.0	(4.4)	(4.4)		(9.4)	(8.1)		gray, white, and black, slight to very slight weathering, hard, close to moderately close fracture spacing, META-GRANODIORITE with inclusions of Meta-Microdiorite.	28.8	
				2:11/1.0	88%	88%		94%	81%		GSI = 85-90		
	651.6	33.8		1:45/1.0									
			5.0	1:49/1.0									
				1:42/1.0									
	651.6	33.8		2:12/1.0									
			5.0	2:40/1.0	(5.0)	(3.7)							
650				2:22/1.0	100%	74%							
				3:02/1.0									
				2:37/1.0									
	646.6	38.8		2:00/1.0									
				1:47/1.0									
Boring Terminated at Elevation 646.6 ft in Crystalline Rock (Meta-Granodiorite)													
- Boring drilled through bridge deck. - Casing Advancer refusal at 16.5 feet.													

NCDOT CORE SINGLE SF280100 GEO\_BRDG0100\_SUMMIT\_GINT.GPJ NC\_DOT.GDT 5/17/18

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 17BP.9.R.101			TIP SF-280100			COUNTY DAVIDSON			GEOLOGIST Shipman, M.						
SITE DESCRIPTION Bridge No. 100 on SR 1810 (Clodfelter Rd.) over Abbotts Creek									GROUND WTR (ft)						
BORING NO. B2-A			STATION 16+27			OFFSET 5 ft LT			ALIGNMENT -L-						
COLLAR ELEV. 685.0 ft			TOTAL DEPTH 33.7 ft			NORTHING 789,059			EASTING 1,654,909						
DRILL RIG/HAMMER EFF./DATE SUM3123 CME-550X 95% 11/30/2017						DRILL METHOD NW Casing WSPT & Core			HAMMER TYPE Automatic						
DRILLER Gonzalez, L.			START DATE 03/28/18			COMP. DATE 03/29/18			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)
685														685.0	0.0
	685.0	0.0	WOR	WOH	WOH						SS-15	56%		GROUND SURFACE	
	682.5	2.5	9	7	4							Sat.		683.5 ALLUVIAL brown, silty CLAY (A-7-5) with some sand gray, sandy SILT (A-4) with trace organics and gravel	
680															1.5
	677.5	7.5	1	WOH	1							Sat.		674.0	11.0
675															
	672.5	12.5	14	24	59						SS-17	15%		671.0	14.0
670														669.3	15.7
	669.3	15.7	60/0.0								RS-2			665.4	19.6
665															
660															
655															
														651.3	33.7
Boring Terminated at Elevation 651.3 ft in Crystalline Rock (Meta-Microdiorite)															
- Boring drilled through bridge deck.															
- Casing Advancer refusal at 15.7 feet.															

## SHEET 17

NCDOT CORE SINGLE SF280100\_GEO\_BRDG0100\_SUMMIT\_GINT.GPJ NC\_DOT.GDT 5/17/18

# GEOTECHNICAL BORING REPORT

## BORE LOG

SHEET 18

<b>WBS</b> 17BP.9.R.101			<b>TIP</b> SF-280100			<b>COUNTY</b> DAVIDSON			<b>GEOLOGIST</b> Shipman, M.		
<b>SITE DESCRIPTION</b> Bridge No. 100 on SR 1810 (Clodfelter Rd.) over Abbotts Creek									<b>GROUND WTR (ft)</b>		
<b>BORING NO.</b> B2-B			<b>STATION</b> 16+27			<b>OFFSET</b> 5 ft RT			<b>ALIGNMENT</b> -L-		
<b>COLLAR ELEV.</b> 684.3 ft			<b>TOTAL DEPTH</b> 33.0 ft			<b>NORTHING</b> 789,054			<b>EASTING</b> 1,654,900		
<b>DRILL RIG/HAMMER EFF/DATE</b> SUM3123 CME-550X 95% 11/30/2017						<b>DRILL METHOD</b> NW Casing WSPT & Core			<b>HAMMER TYPE</b> Automatic		
<b>DRILLER</b> Gonzalez, L.			<b>START DATE</b> 03/28/18			<b>COMP. DATE</b> 03/28/18			<b>SURFACE WATER DEPTH</b> N/A		

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)		
685																	
	684.3	0.0													684.3	GROUND SURFACE	0.0
	682.6	1.7	WOR	WOH	2												
680			1	1	1												
	677.6	6.7	WOR	WOH	WOH												
675											SS-13	36%			675.1		9.2
	672.6	11.7	12	22	78/0.3										672.1		12.2
670																	
	667.6	16.7													667.6		16.7
665																	
660																	
655																	
															654.2		30.1
															651.3		33.0
															<b>CRYSTALLINE ROCK</b> (Meta-Granodiorite) REC: 95% RQD: 81% GSI: 80-85		
															<b>WEATHERED ROCK</b> (Meta-Granodiorite)		
															<b>RESIDUAL</b> gray-green, sandy SILT (A-4)		
															<b>ALLUVIAL</b> brown to gray, sandy SILT (A-4) with some clay and little organics		
															Boring Terminated at Elevation 651.3 ft in Crystalline Rock (Meta-Microdiorite)  - Boring drilled through bridge deck.		

NCDOT BORE SINGLE SF280100\_GEO\_BRDG0100\_SUMMIT\_GINT.GPJ NC\_DOT.GDT 5/17/18

# GEOTECHNICAL BORING REPORT

## CORE LOG

SHEET 19

<b>WBS</b> 17BP.9.R.101				<b>TIP</b> SF-280100		<b>COUNTY</b> DAVIDSON				<b>GEOLOGIST</b> Shipman, M.			
<b>SITE DESCRIPTION</b> Bridge No. 100 on SR 1810 (Clodfelter Rd.) over Abbotts Creek										<b>GROUND WTR (ft)</b>			
<b>BORING NO.</b> B2-B				<b>STATION</b> 16+27				<b>OFFSET</b> 5 ft RT		<b>ALIGNMENT</b> -L-		<b>0 HR.</b> N/A	
<b>COLLAR ELEV.</b> 684.3 ft				<b>TOTAL DEPTH</b> 33.0 ft				<b>NORTHING</b> 789,054		<b>EASTING</b> 1,654,900		<b>24 HR.</b> FIAD	
<b>DRILL RIG/HAMMER EFF./DATE</b> SUM3123 CME-550X 95% 11/30/2017								<b>DRILL METHOD</b> NW Casing WSPT & Core			<b>HAMMER TYPE</b> Automatic		
<b>DRILLER</b> Gonzalez, L.				<b>START DATE</b> 03/28/18				<b>COMP. DATE</b> 03/28/18		<b>SURFACE WATER DEPTH</b> N/A			
<b>CORE SIZE</b> NQ-2				<b>TOTAL RUN</b> 16.3 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)	
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %				
667.6	667.6	16.7	1.3	N=60/0.0	(1.1)	(0.9)		(12.7)	(10.9)		Begin Coring @ 16.7 ft		
665	666.3	18.0	5.0	1:00/0.3	85%	69%		95%	81%		<b>CRYSTALLINE ROCK</b>	16.7	
				3:02/1.0							gray and white, v. slight weathering to fresh, hard, close to mod. close fracture spacing, META-GRANODIORITE.		
				2:42/1.0	(4.7)	(3.7)					GSI = 80-85		
				3:21/1.0	94%	74%							
				2:57/1.0									
				3:22/1.0									
660	661.3	23.0	5.0	3:35/1.0	(4.8)	(4.4)							
				3:24/1.0									
				3:48/1.0	96%	88%							
				4:20/1.0									
				4:28/1.0									
	656.3	28.0		5:22/1.0									
655	655.2	29.1	1.1	5:01/1.0	(1.1)	(1.1)							
			3.9	0:54/0.1	100%	100%							
				4:53/0.9	(3.6)	(2.7)		(2.6)	(1.9)		gray, white, and black, slight weathering, hard to very hard, close to moderately close fracture spacing, META-MICRODIORITE.	30.1	
				4:43/1.0				90%	66%		GSI = 75-80		
	651.3	33.0		5:37/1.0	92%	69%					Boring Terminated at Elevation 651.3 ft in Crystalline Rock (Meta-Microdiorite)	33.0	
											- Boring drilled through bridge deck.		

# GEOTECHNICAL BORING REPORT

## BORE LOG

SHEET 20

<b>WBS</b> 17BP.9.R.101			<b>TIP</b> SF-280100			<b>COUNTY</b> DAVIDSON			<b>GEOLOGIST</b> Worley, B.		
<b>SITE DESCRIPTION</b> Bridge No. 100 on SR 1810 (Clodfelter Rd.) over Abbotts Creek									<b>GROUND WTR (ft)</b>		
<b>BORING NO.</b> EB2-A			<b>STATION</b> 16+91			<b>OFFSET</b> 6 ft LT			<b>ALIGNMENT</b> -L-		
<b>COLLAR ELEV.</b> 691.2 ft			<b>TOTAL DEPTH</b> 22.3 ft			<b>NORTHING</b> 789,005			<b>EASTING</b> 1,654,942		
<b>DRILL RIG/HAMMER EFF/DATE</b> SUM3123 CME-550X 95% 11/30/2017						<b>DRILL METHOD</b> H.S. Augers			<b>HAMMER TYPE</b> Automatic		
<b>DRILLER</b> Gonzalez, L.			<b>START DATE</b> 03/26/18			<b>COMP. DATE</b> 03/26/18			<b>SURFACE WATER DEPTH</b> N/A		

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					ELEV. (ft)
695															
690															691.2 GROUND SURFACE 0.0 690.2 ROADWAY EMBANKMENT 1.0 Asphalt and ABC Stone gray-brown, silty SAND (A-2-4) with some gravel
685	687.5	3.7	4	6	5										684.2 ALLUVIAL 7.0 gray, sandy SILT (A-4) with little clay
680	682.5	8.7	3	4	5										
675	677.5	13.7	1	1	2										
670	672.5	18.7	2	3	4										
	668.9	22.3													670.4 WEATHERED ROCK 20.8 (Meta-Granodiorite) 668.9 CRYSTALLINE ROCK 22.3 (Meta-Granodiorite) Boring Terminated with Standard Penetration Test Refusal at Elevation 668.9 ft on Crystalline Rock (Meta-Granodiorite) - Auger refusal at 22.3 feet.

NCDOT BORE SINGLE SF280100\_GEO\_BRDG0100\_SUMMIT\_GINT.GPJ NC\_DOT.GDT 5/17/18

# GEOTECHNICAL BORING REPORT

## BORE LOG

SHEET 21

<b>WBS</b> 17BP.9.R.101			<b>TIP</b> SF-280100			<b>COUNTY</b> DAVIDSON			<b>GEOLOGIST</b> Worley, B.		
<b>SITE DESCRIPTION</b> Bridge No. 100 on SR 1810 (Clodfelter Rd.) over Abbotts Creek									<b>GROUND WTR (ft)</b>		
<b>BORING NO.</b> EB2-B			<b>STATION</b> 16+91			<b>OFFSET</b> 6 ft RT			<b>ALIGNMENT</b> -L-		
<b>COLLAR ELEV.</b> 691.2 ft			<b>TOTAL DEPTH</b> 23.4 ft			<b>NORTHING</b> 788,998			<b>EASTING</b> 1,654,932		
<b>DRILL RIG/HAMMER EFF./DATE</b> SUM3123 CME-550X 95% 11/30/2017						<b>DRILL METHOD</b> H.S. Augers			<b>HAMMER TYPE</b> Automatic		
<b>DRILLER</b> Gonzalez, L.			<b>START DATE</b> 03/26/18			<b>COMP. DATE</b> 03/26/18			<b>SURFACE WATER DEPTH</b> N/A		

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	L O G	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
695																
690																691.2 GROUND SURFACE 0.0 690.2 ROADWAY EMBANKMENT 1.0 Asphalt and ABC Stone orange-brown and gray, silty SAND (A-2-4) with some gravel
685	687.6	3.6		10	10	8							M			685.2 6.0
680	682.6	8.6		1	2	1							M			ALLUVIAL gray, sandy SILT (A-4) with little clay and wood fragments
675	677.6	13.6	WOH		2	3							Sat.			
670	672.6	18.6		2	2	2							Sat.			
	667.9	23.3														669.6 WEATHERED ROCK 21.6 (Meta-Granodiorite) 667.8 CRYSTALLINE ROCK 23.4 (Meta-Granodiorite) Boring Terminated with Standard Penetration Test Refusal at Elevation 667.8 ft on Crystalline Rock (Meta-Granodiorite) - Auger refusal at 23.3 feet.
			60/0.1													

NCDOT BORE SINGLE SF280100\_GEO\_BRDG0100\_SUMMIT\_GINT.GPJ NC\_DOT.GDT 5/17/18



**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION**  
**DIVISION OF HIGHWAY**  
**MATERIALS & TESTS UNIT**  
**SOILS LABORATORY**

**T. I. P. No.** SF-280100

**REPORT ON SAMPLES OF** Bridge 100 on SR 1810 over Abbotts Creek

<b>Project</b>	<u>17BP.9.R.101</u>	<b>County</b>	<u>Davidson</u>	<b>Owner</b>	<u>B. Worley, PG</u>
<b>Date: Sampled</b>	<u>3/26/18 to 3/29/18</u>	<b>Received</b>	<u>4/20/18</u>	<b>Reported</b>	<u>4/26/18</u>
<b>Sampled from</b>	<u>Roadway and Structure</u>	<b>By</b>	<u>B. Worley, M. Shipman</u>		
<b>Submitted by</b>	<u>B. Worley</u>		<u>2008</u>	<u>Standard Specifications</u>	

4/26/18

**TEST RESULTS**

Proj. Sample No.		SS-2	SS-8	SS-13	SS-15	SS-17	SS-18
Boring No.		EB1-B	B1-B	B2-B	B2-A	B2-A	B1-A
Retained #4 Sieve	%	0	0	0	0	0	0
Passing #10 Sieve	%	98	100	100	100	99	100
Passing #40 Sieve	%	93	97	98	95	89	98
Passing #200 Sieve	%	44	69	70	79	62	75

**MINUS NO. 10 FRACTION**

SOIL MORTAR - 100%							
Coarse Sand Ret - #60	%	11.3	5.8	5.6	5.7	13.5	4.2
Fine Sand Ret - #270	%	57.0	37.0	32.2	26.1	47.3	30.9
Silt 0.05 - 0.005 mm	%	14.5	41.2	25.4	39.0	35.1	34.8
Clay < 0.005 mm	%	17.1	16.1	36.8	29.1	4.1	30.1
Passing #40 Sieve	%	95.0	97.5	97.9	95.3	90.2	97.9
Passing #200 Sieve	%	44.4	68.8	70.1	79.2	63.3	75.4

L. L.	20	42	31	48	27	45
P. I.	0	6	9	16	0	13
AASHTO Classification	A-4	A-5	A-4	A-7-5	A-4	A-7-5
Group Index	0	5	5	14	0	11
pH	N/A	N/A	N/A	N/A	N/A	N/A
Station	15+05	15+57	16+27	16+27	16+27	15+57
OFFSET	6'RT	5'RT	5'RT	5'LT	5'LT	5'LT
ALIGNMENT	-L-	-L-	-L-	-L-	-L-	-L-
Depth (Ft)	8.7	0.0	6.7	0.0	12.5	0.0
to	10.2	1.5	8.2	1.5	14.0	1.5
Natural Moisture %	26.6	50.2	36.2	55.9	14.7	54.0

*Daion Hackett*

Soils Engineer

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION**  
**DIVISION OF HIGHWAY**  
**MATERIALS & TESTS UNIT**  
**SOILS LABORATORY**

**T. I. P. No.** SF-280100

**REPORT ON SAMPLES OF** Bridge 100 on SR 1810 over Abbotts Creek

<b>Project</b>	<u>17BP.9.R.101</u>	<b>County</b>	<u>Davidson</u>	<b>Owner</b>	<u>B. Worley, PG</u>
<b>Date: Sampled</b>	<u>3/26/18 to 3/29/18</u>	<b>Received</b>	<u>4/20/18</u>	<b>Reported</b>	<u>4/26/18</u>
<b>Sampled from</b>	<u>Roadway and Structure</u>	<b>By</b>	<u>B. Worley, M. Shipman</u>		
<b>Submitted by</b>	<u>B. Worley</u>		<u>2008</u>	<u>Standard Specifications</u>	

4/26/18

**TEST RESULTS**

Proj. Sample No.		<b>SS-19</b>					
Boring No.		<b>B1-A</b>					
Retained #4 Sieve	%	<b>0</b>					
Passing #10 Sieve	%	<b>100</b>					
Passing #40 Sieve	%	<b>97</b>					
Passing #200 Sieve	%	<b>67</b>					

**MINUS NO. 10 FRACTION**

SOIL MORTAR - 100%							
Coarse Sand Ret - #60	%	<b>7.5</b>					
Fine Sand Ret - #270	%	<b>32.4</b>					
Silt 0.05 - 0.005 mm	%	<b>8.3</b>					
Clay < 0.005 mm	%	<b>51.8</b>					
Passing #40 Sieve	%	<b>97.0</b>					
Passing #200 Sieve	%	<b>67.4</b>					

L. L.	<b>40</b>						
P. I.	<b>13</b>						
AASHTO Classification	<b>A-6</b>						
Group Index	<b>8</b>						
pH	<b>N/A</b>						
Station	<b>15+57</b>						
OFFSET	<b>5'LT</b>						
ALIGNMENT	<b>-L-</b>						
Depth (Ft)	<b>2.3</b>						
	<b>to</b>	<b>3.8</b>					
Natural Moisture %	<b>90.4</b>						

*Arnon Hackett*

Soils Engineer

**ROCK CORE UNIAXIAL COMPRESSIVE STRENGTH TEST**  
**ASTM D-7012-10 METHOD C**

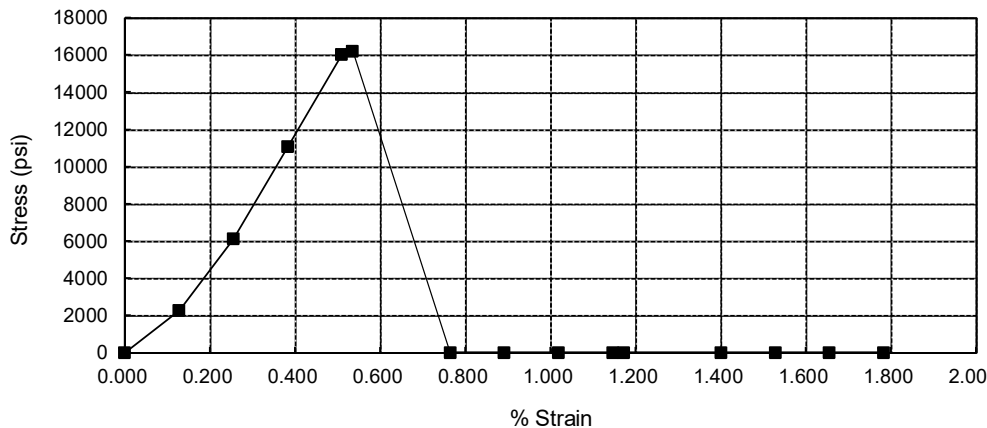
Job No.: G17017.03      Job Name: SF-280100 Bridge 100  
 Date: 5/7/2018      Sample No.: RS-1  
 Boring No.: B1-B      Depth (ft): 24.2-24.6  
 Description:

1728

Length (in.): 3.927      Volume (in<sup>3</sup>): 12.03053615  
 Diameter (in.): 1.975      Volume (cf): 0.006962116  
 Area (sq. in.): 3.064      Unit Weight (pcf): 186.3744

Compressive Strength (psi): 16220

<u>Deflection (in.)</u>	<u>Strain (%)</u>	<u>Load (lbf)</u>	<u>Compressive Strength (psi)</u>	<u>Young's Modulus (psi)</u>
0.000	0.000	0	0.0	
0.005	0.127	6950	2268.6	1,781,770
0.010	0.255	18730	6113.8	2,400,903
0.015	0.382	33920	11072.1	2,898,688
0.020	0.509	49130	16037.0	3,148,862
0.021	0.535	49690	16219.8	3,033,099
0.030	0.764		0.0	0
0.035	0.891		0.0	0
0.040	1.019		0.0	0
0.045	1.146		0.0	0
0.046	1.171		0.0	0
0.055	1.401		0.0	0
0.060	1.528		0.0	0
0.065	1.655		0.0	0
0.070	1.783		0.0	0

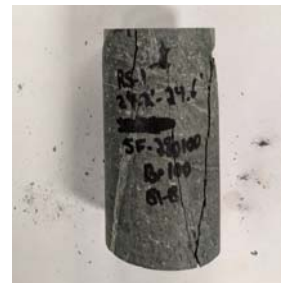
Notes:

Young's modulus is calculated using the secant modulus at each data interval per Figure 2 (C) in ASTM D 7012.

Length:Diameter Ratio = 1.99 due to lack of available sample.

*Michael J Bauer*

NCDOT Cert No. 105-02-0803



**ROCK CORE UNIAXIAL COMPRESSIVE STRENGTH TEST**  
**ASTM D-7012-10 METHOD C**

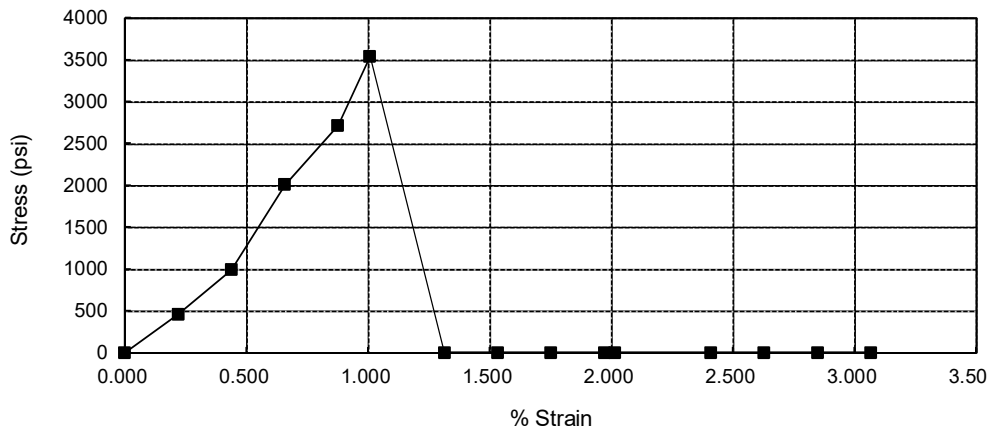
Job No.: G17017.03      Job Name: SF-280100 Bridge 100  
 Date: 5/7/2018      Sample No.: RS-2  
 Boring No.: B2-A      Depth (ft): 17.0-17.7  
 Description:

1728

Length (in.): 2.283      Volume (in<sup>3</sup>): 7.015334239  
 Diameter (in.): 1.978      Volume (cf): 0.0040598  
 Area (sq. in.): 3.073      Unit Weight (pcf): 164.5204

Compressive Strength (psi): 3544

<u>Deflection (in.)</u>	<u>Strain (%)</u>	<u>Load (lbf)</u>	<u>Compressive Strength (psi)</u>	<u>Young's Modulus (psi)</u>
0.000	0.000	0	0.0	
0.005	0.219	1410	458.9	209,514
0.010	0.438	3050	992.6	226,602
0.015	0.657	6170	2007.9	305,603
0.020	0.876	8350	2717.3	310,184
0.023	1.007	10890	3543.9	351,774
0.030	1.314		0.0	0
0.035	1.533		0.0	0
0.040	1.752		0.0	0
0.045	1.971		0.0	0
0.046	2.015		0.0	0
0.055	2.409		0.0	0
0.060	2.628		0.0	0
0.065	2.847		0.0	0
0.070	3.066		0.0	0



Notes:

Young's modulus is calculated using the secant modulus at each data interval per Figure 2 (C) in ASTM D 7012.

Length:Diameter Ratio = 1.15 due to lack of available sample.

*Michael J Bauer*

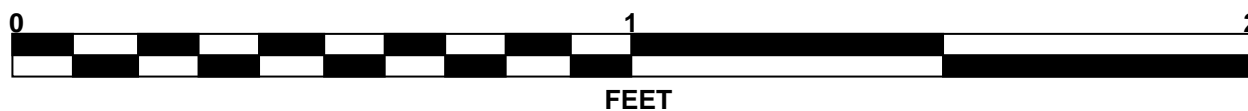
NCDOT Cert No. 105-02-0803



# CORE PHOTOGRAPHS

## B1-A

BOXES 1 & 2: 17.4 - 32.4 FEET





# CORE PHOTOGRAPHS

## B1-B

BOXES 1 through 3: 16.5 - 38.8 FEET

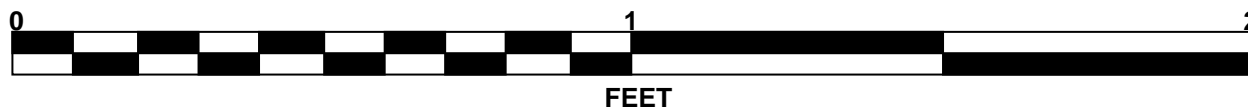
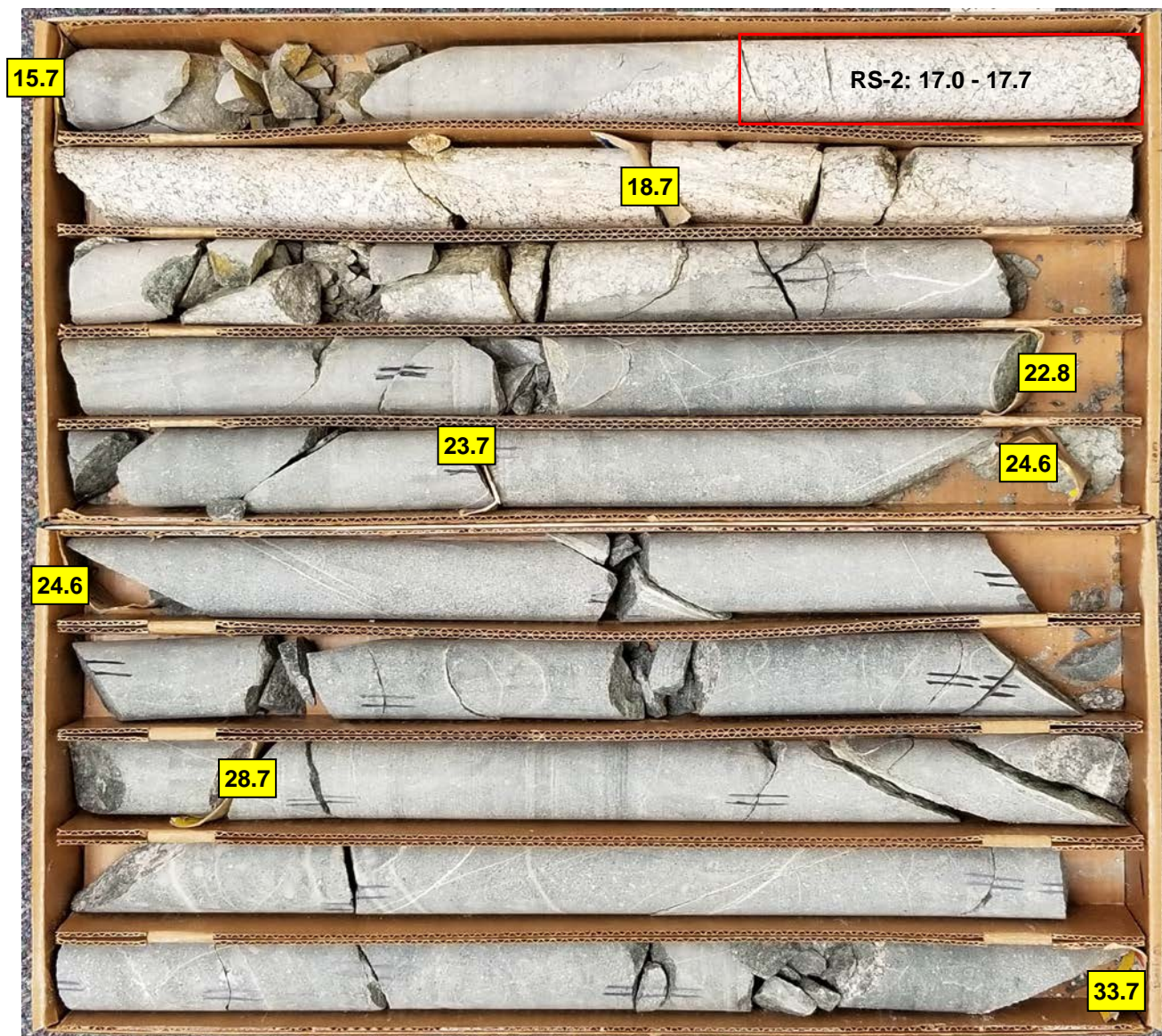




# CORE PHOTOGRAPHS

## B2-A

BOXES 1 &amp; 2: 15.7 - 33.7 FEET





# CORE PHOTOGRAPHS

## B2-B

BOXES 1 & 2: 16.7 - 33.0 FEET





## SITE PHOTOGRAPHS

Bridge No. 100 on SR 1810 (Clodfelter Road) over Abbotts Creek



Standing at End Bent 1 and looking south



Standing at End Bent 2 and looking north